

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An ink jet printer, comprising:

a printing unit having a carriage and a print head in which a plurality of ink jet nozzles are arranged in plural columns, the printing unit printing on a printing medium while reciprocating the print head by the carriage for go-printing and return-printing;

a sensor disposed on the carriage and having a light-emitting portion for emitting light toward the printing medium and a light-receiving portion for receiving reflected light from the printing medium;

a test pattern printing control unit that causes the printing unit to print a test pattern in which vertical ruled lines are arranged with a prescribed pitch;

a plural patterns printing instructing unit that causes the printing unit to print a plurality of test patterns while changing a test pattern printing interval of the return-printing with respect to the go-printing in plural stages;

a best pattern detecting unit for scanning-in the printed test patterns with the sensor and for automatically selecting a best test pattern from the scanned-in test patterns; and

a best pattern printing instructing unit that causes the printing unit to print information indicating an image of the selected best test pattern on the printing medium.

2. (Currently Amended) The ink jet printer according to claim 1, wherein the best pattern printing instructing unit causes the printing unit to print the selected best test pattern on the printing medium at the test pattern printing interval that produces the selected best test pattern as information indicating the image of the selected best test pattern.

3. (Currently Amended) The ink jet printer according to claim 1, wherein the best pattern printing instructing unit causes the printing unit to print information indicating a test

pattern printing interval that produces the selected best test pattern as information indicating the image of the selected best test pattern.

4. (Original) The ink jet printer according to claim 1, wherein the best pattern detecting unit comprises:

a sum-of-deviations calculating unit for calculating, for each of the test patterns, a sum of density deviations of a number of vertical ruled lines with respect to a density center value of the vertical ruled lines; and

a pattern selecting unit for selecting the best test pattern from the scanned-in test patterns, the best test pattern having the minimum sum of density deviations calculated by the sum-of-deviations calculating unit.

5. (Previously Presented) The ink jet printer according to claim 1, wherein the sensor detects at least one of a front end portion, a rear end portion, and a width portion of the printing medium.

6. (Original) The ink jet printer according to claim 1, further comprising:
a detection result judging unit for judging whether a detection made by the best pattern detecting unit is appropriate; and

a re-detection executing unit that causes the printing unit to print the plurality of test patterns again while changing a printing condition and causes the sensor to scan the printed test patterns again when the detection result judging unit judges that the detection made by the best pattern detecting unit is not appropriate.

7. (Original) The ink jet printer according to claim 4, further comprising:
a detection result judging unit for judging whether a detection made by the best pattern detecting unit is appropriate; and
a re-detection executing unit that causes the printing unit to print the plurality of test patterns again while changing a printing condition and causes the sensor to scan the printed

test patterns again when the detection result judging unit judges that the detection made by the best pattern detecting unit is not appropriate.

8. (Original) The ink jet printer according to claim 7, wherein the detection result judging unit judges whether a difference between a maximum value and a minimum value among sum of density deviations of respective test patterns is not less than a predetermined value, and judges that the detection made by the best pattern detecting unit is appropriate when the difference is not less than the predetermined value.

9. (Original) The ink jet printer according to claim 6, wherein the re-detection executing unit causes the printing unit to print the plurality of test patterns while changing a number of printing times, and the printing unit conducts go-printing and return-printing for each line along a go/return direction a number of times equal to the changed printing times.

10. (Currently Amended) An ink jet printer, comprising:

a printing unit having a carriage and a print head in which a plurality of ink jet nozzles are arranged in plural columns, the printing unit printing on a printing medium while reciprocating the print head by the carriage for go-printing and return-printing;

a sensor disposed on the carriage and having a light-emitting portion for emitting light toward the printing medium and a light-receiving portion for receiving reflection light;

a plural patterns printing instructing unit that causes the printing unit to print a plurality of test patterns in each of which vertical ruled lines are arranged with a prescribed pitch, while changing a test pattern printing interval of the return-printing with respect to the go-printing in plural stages;

a best pattern detecting unit for scanning-in the printed test patterns with the sensor and for automatically selecting a best test pattern from the scanned-in test patterns; and

a best pattern printing instructing unit that causes the printing unit to print information indicating an image of the selected best test pattern on the printing medium.

11. (Previously Presented) An ink jet printer, comprising:

a printing unit having a carriage and a print head in which a plurality of ink jet nozzles are arranged in plural columns, the printing unit printing on a printing medium while reciprocating the print head by the carriage for go-printing and return-printing;

a sensor disposed on the carriage and having a light-emitting portion for emitting light toward the printing medium and a light-receiving portion for receiving reflected light from the printing medium;

a test pattern printing control unit that causes the printing unit to print a test pattern in which vertical ruled lines are arranged with a prescribed pitch;

a plural patterns printing instructing unit that causes the printing unit to print a plurality of test patterns while changing a test pattern printing interval of the return-printing with respect to the go-printing in plural stages;

a best pattern detecting unit for scanning-in each printed test pattern with the sensor and for automatically selecting a best test pattern from the plurality of test patterns; and

a best pattern printing instructing unit that causes the printing unit to print best test pattern related information on the printing medium,

wherein the best pattern detecting unit comprises:

a sum-of-deviations calculating unit for calculating, for each of the test patterns, a sum of density deviations of a number of vertical ruled lines with respect to a density center value of the vertical ruled lines; and

a sequential pattern selecting unit for selecting a test pattern scanned immediately before a test pattern that is currently scanned by the sensor as the best test pattern when the sum of density deviations of the test pattern currently scanned is equal to or more than that of the test pattern scanned immediately before.

12. (Original) The ink jet printer according to claim 11, wherein the sequential pattern selecting unit selects a test pattern that is currently scanned as the best test pattern when the test pattern currently scanned is the last test pattern among the plurality of test patterns.

13. (Currently Amended) The ink jet printer according to claim 1, wherein each test pattern has a plurality of first regions and a plurality of second regions, each first region having both a plurality of dots that is printed by go-printing and a plurality of dots that is printed by return-printing, each second region having only a plurality of dots that is printed by one of go-printing and return-printing, a number of the sum of the dots per unit area of the first region being equal to a number of dots per unit area of the second region.

14. (Previously Presented) The ink jet printer according to claim 13, wherein the plurality of first regions and the plurality of second regions are disposed alternately on each test pattern.

15. (Previously Presented) An ink jet printer, comprising:

- a printing unit having a carriage and a print head in which a plurality of ink jet nozzles are arranged in plural columns, the print unit printing on a printing medium while reciprocating the print head by the carriage for go-printing and return-printing;
- a sensor disposed on the carriage and having a light-emitting portion for emitting light toward the printing medium and a light-receiving portion for receiving reflected light from the printing medium;
- a test pattern printing control unit that causes the printing unit to print a test pattern in which vertical ruled lines are arranged with a prescribed pitch;
- a plural patterns printing instructing unit that causes the printing unit to print a plurality of test patterns while changing a test pattern printing interval of the return-printing with respect to the go-printing in plural stages;

a best pattern detecting unit for scanning-in the printed test patterns with the sensor and for automatically selecting a best test pattern from the scanned-in test patterns; and

wherein the best pattern detecting unit comprises:

a sum-of-deviations calculating unit for calculating, for each of the test patterns, a sum of density deviations of a number of vertical ruled lines with respect to a density center value of the vertical ruled lines; and

a pattern selecting unit for selecting the best test pattern from the scanned-in test patterns, the best test pattern having the minimum sum of density deviations calculated by the sum-of-deviations calculating unit.

16. (Previously Presented) The ink jet printer according to claim 15, further comprising a best pattern printing instructing unit that causes the printing unit to print an additional pattern on the printing medium at the test pattern printing interval that produces the selected best test pattern,

17. (Previously Presented) The ink jet printer according to claim 15, further comprising:

a detection result judging unit for judging whether a detection made by the best pattern detecting unit is appropriate; and

a re-detection executing unit that causes the printing unit to print the plurality of test patterns again while changing a printing condition and causes the sensor to scan the printed test patterns again when the detection result judging unit judges that the detection made by the best pattern detecting unit is not appropriate.

18. (Previously Presented) The ink jet printer according to claim 17, wherein the detection result judging unit judges whether a difference between a maximum value and a minimum value among sum of density deviations of respective test patterns is not less than a

predetermined value, and judges that the detection made by the best pattern detecting unit is appropriate when the difference is not less than the predetermined value.

19. (Currently Amended) An ink jet printer, comprising:

a printing unit having a carriage and a print head in which a plurality of ink jet nozzles are arranged in plural columns, the print unit printing on a printing medium while reciprocating the print head by the carriage for go-printing and return-printing;

a sensor disposed on the carriage and having a light-emitting portion for emitting light toward the printing medium and a light-receiving portion for receiving reflected light from the printing medium;

a test pattern printing control unit that causes the printing unit to print a test pattern in which vertical ruled lines are arranged with a prescribed pitch;

a plural patterns printing instructing unit that causes the printing unit to print a plurality of test patterns while changing a test pattern printing interval of the return-printing with respect to the go-printing in plural stages; and

a best pattern detecting unit for scanning-in the printed test patterns with the sensor and for automatically selecting a best test pattern from the scanned-in test patterns;

wherein each test pattern has a plurality of first regions and a plurality of second regions, each first region having both a plurality of dots that is printed by go-printing and a plurality of dots that is printed by return-printing, each second region having only a plurality of dots that is printed by one of go-printing and return-printing, a number of the sum of the dots per unit area of the first region being equal to a number of dots per unit area of the second region.

20. (Previously Presented) The ink jet printer according to claim 19, further comprising a best pattern printing instructing unit that causes the printing unit to print an

additional pattern on the printing medium at the test pattern printing interval that produces the selected best test pattern.

21. (Previously Presented) The ink jet printer according to claim 19, wherein the plurality of first regions and the plurality of second regions are disposed alternately on each test pattern.

22. (New) The ink jet printer according to claim 19, wherein each test pattern has a common configuration of the plurality of first regions and the plurality of second regions.